

CLAIM AMENDMENTS

1. (Currently Amended) A semiconductor laser device which emits light at an oscillation wavelength, the laser device comprising: a reflective film ~~constituted of including~~ a multilayer dielectric films film, being provided on at least one side of optical exit faces ~~face~~ of a laser chip₁, wherein the reflective film includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n1, a second dielectric film of a refractive index n2, a third dielectric film of a refractive index n3, and a fourth dielectric film of a refractive index n4, and ~~each of refractive indices satisfies a relation: n2 = n4 < n1 < n3.~~

2. (Currently Amended) A semiconductor laser device which emits light at an oscillation wavelength, the laser device comprising: a reflective film ~~constituted of including~~ a multilayer dielectric films film, being provided on at least one side of optical exit faces of a laser chip₁, wherein the reflective film includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n1, a second dielectric film of a refractive index n2, a third dielectric film of a refractive index n3, and a fourth dielectric film of a refractive index n4, and ~~each of refractive indices satisfies a relation: n2 = n4 < n3 < n1.~~

3. (Currently Amended) The semiconductor laser device according to Claim 1, wherein each ~~thickness~~ of the first ~~to, second, third, and fourth~~ dielectric films ~~is set up~~ has a thickness, in terms of optical length, within $\pm 30\%$ ~~of range~~ of a thickness ~~of that is an integral integer multiple of 1/4 of the~~ oscillation wavelength of the semiconductor laser device.

4. (Currently Amended) The semiconductor laser device according to Claim 2, wherein each ~~thickness~~ of the first ~~to, second, third, and fourth~~ dielectric films ~~is set up~~ has a thickness, in terms of optical length, within $\pm 30\%$ ~~of range~~ of a thickness ~~of that is an integral integer multiple of 1/4 of the~~ oscillation wavelength of the semiconductor laser device.

5. (Currently Amended) A semiconductor laser device which emits light of an oscillation wavelength λ , comprising:

a reflective film ~~constituted of including~~ a multilayer dielectric films film, being provided on at least one side of optical exit faces of a laser chip₁, wherein

the reflective film ~~having~~ has a reflectance of 3% to 15% and includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n1 and a thickness d1, a second dielectric film of a refractive index n2 and a thickness d2, a

third dielectric film of a refractive index n_3 and a thickness d_3 , and a fourth dielectric film of a refractive index n_4 and a thickness d_4 , ~~and~~

the refractive index n_1 satisfies $1.6 < n_1 \leq 1.9$, the refractive index n_2 satisfies $1.3 \leq n_2 \leq 1.6$, the refractive index n_3 satisfies $1.9 < n_3 \leq 2.3$, and the refractive index n_4 satisfies $1.3 \leq n_4 \leq 1.6$, and

the thickness d_1 is substantially equal to $(2 \cdot h + 1)\lambda/(4 \cdot n_1)$, the thickness d_2 is substantially equal to $(2 \cdot i + 1)\lambda/(4 \cdot n_2)$, the thickness d_3 is substantially equal to $(2 \cdot j + 1)\lambda/(4 \cdot n_3)$, and the thickness d_4 is substantially equal to $(2 \cdot k + 1)\lambda/(4 \cdot n_4)$, ~~wherein~~ and each of h , i , j , and k is zero or ~~more~~ a positive integer.

6. (Currently Amended) A semiconductor laser device which emits light of an oscillation wavelength λ , the laser device comprising:

a reflective film ~~constituted of~~ including a multilayer dielectric film, ~~being provided~~ on at least one side of optical exit faces of a laser chip, wherein

the reflective film ~~having~~ has a reflectance of 3% to 15% and includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n_1 and a thickness d_1 , a second dielectric film of a refractive index n_2 and a thickness d_2 , a third dielectric film of a refractive index n_3 and a thickness d_3 , and a fourth dielectric film of a refractive index n_4 and a thickness d_4 , ~~and~~

the refractive index n_1 satisfies $1.9 < n_1 \leq 2.3$, the refractive index n_2 satisfies $1.3 \leq n_2 \leq 1.6$, the refractive index n_3 satisfies $1.6 < n_3 \leq 1.9$, and the refractive index n_4 satisfies $1.3 \leq n_4 \leq 1.6$, and

the thickness d_1 is substantially equal to $(2 \cdot h + 1)\lambda/(4 \cdot n_1)$, the thickness d_2 is substantially equal to $(2 \cdot i + 1)\lambda/(4 \cdot n_2)$, the thickness d_3 is substantially equal to $(2 \cdot j + 1)\lambda/(4 \cdot n_3)$, and the thickness d_4 is substantially equal to $(2 \cdot k + 1)\lambda/(4 \cdot n_4)$, ~~wherein~~ each of h , i , j , and k is zero or ~~more~~ a positive integer.

7. (Currently Amended) The semiconductor laser device according to Claim 1, wherein the first dielectric film is ~~formed of either~~ selected from the group consisting of Al_2O_3 , CeF_3 , NdF_3 , MgO , and Y_2O_3 , the second and fourth dielectric films are ~~formed of either~~ selected from the group consisting of SiO_2 , MgF_2 , BaF_2 , and CaF_2 , and the third dielectric film is ~~formed of either~~ selected from the group consisting of Ta_2O_5 , SiO , ZrO_2 , ZnO , TiO , TiO_2 , ZnS , Nb_2O_5 , HfO_2 , and AlN .

8. (Currently Amended) The semiconductor laser device according to Claim 5, wherein the first dielectric film is ~~formed of either~~ selected from the group consisting of Al_2O_3 , CeF_3 , NdF_3 , MgO_x and Y_2O_3 , the second and fourth dielectric films are ~~formed of either~~ selected from the group consisting of SiO_2 , MgF_2 , BaF_2 , and CaF_2 , and the third dielectric film is ~~formed of either~~ selected from the group consisting of Ta_2O_5 , SiO , ZrO_2 , ZnO , TiO , TiO_2 , ZnS , Nb_2O_5 , HfO_{2x} and AlN .

9. (Currently Amended) The semiconductor laser device according to Claim 2, wherein the first dielectric film is ~~formed of either~~ selected from the group consisting of Ta_2O_5 , SiO , ZrO_2 , ZnO , TiO , TiO_2 , ZnS , Nb_2O_5 , HfO_{2x} and AlN , the second and fourth dielectric films are ~~formed of either~~ selected from the group consisting of SiO_2 , MgF_2 , BaF_2 , and CaF_2 , and the third dielectric film is ~~formed of either~~ selected from the group consisting of Al_2O_3 , CeF_3 , NdF_3 , MgO_x and Y_2O_3 .

10. (Currently Amended) The semiconductor laser device according to Claim 6, wherein the first dielectric film is ~~formed of either~~ selected from the group consisting of Ta_2O_5 , SiO , ZrO_2 , ZnO , TiO , TiO_2 , ZnS , Nb_2O_5 , HfO_{2x} and AlN , the second and fourth dielectric films are ~~formed of either~~ selected from the group consisting of SiO_2 , MgF_2 , BaF_2 , and CaF_2 , and the third dielectric film is ~~formed of either~~ selected from the group consisting of Al_2O_3 , CeF_3 , NdF_3 , MgO_x and Y_2O_3 .

11. (Currently Amended) The semiconductor laser device according to Claim 1, ~~wherein a multilayer dielectric film in combination with~~ including a fifth dielectric film and a sixth dielectric film ~~is additionally formed~~ in a region other than a light emitting point on the optical exit faces of the laser chip, and ~~a~~ reflectance of the region other than the light emitting point is smaller than ~~a~~ reflectance of the region of the light emitting point.

12. (Currently Amended) The semiconductor laser device according to Claim 2, ~~wherein a multilayer dielectric film in combination with~~ including a fifth dielectric film and a sixth dielectric film ~~is additionally formed~~ in a region other than a light emitting point on the optical exit faces of the laser chip, and ~~a~~ reflectance of the region other than the light emitting point is smaller than ~~a~~ reflectance of the region of the light emitting point.

13. (Currently Amended) The semiconductor laser device according to Claim 11, wherein each ~~thickness~~ of the fifth and sixth dielectric films ~~is set up~~ has a thickness, in terms

of optical length, within $\pm 30\%$ of range of ~~a thickness of~~ an integral multiple of $1/4$ of the oscillation wavelength of the semiconductor laser device.

14. (Currently Amended) The semiconductor laser device according to Claim 12, wherein each ~~thickness~~ of the fifth and sixth dielectric films ~~is set up~~ has a thickness, in terms of optical length, within $\pm 30\%$ of range of ~~a thickness of~~ an integral multiple of $1/4$ of the oscillation wavelength of the semiconductor laser device.

15. (Currently Amended) The semiconductor laser device according to Claim 13, wherein the fifth dielectric film is ~~formed of either~~ selected from the group consisting of Al_2O_3 , CeF_3 , NdF_3 , MgO , and Y_2O_3 , and the sixth dielectric film is ~~formed of either~~ selected from the group consisting of SiO_2 , MgF_2 , BaF_2 , and CaF_2 .

16. (Currently Amended) The semiconductor laser device according to Claim 14, wherein the fifth dielectric film is ~~formed of either~~ selected from the group consisting of Al_2O_3 , CeF_3 , NdF_3 , MgO , and Y_2O_3 , and the sixth dielectric film is ~~formed of either~~ selected from the group consisting of SiO_2 , MgF_2 , BaF_2 , and CaF_2 .

17. (Currently Amended) The semiconductor laser device according to Claim 1, wherein the laser chip has a plurality of light emitting points which emit at least two ~~or more~~ different oscillation wavelengths.

18. (Currently Amended) The semiconductor laser device according to Claim 2, wherein the laser chip has a plurality of light emitting points which emit at least two ~~or more~~ different oscillation wavelengths.

19. (Currently Amended) The semiconductor laser device according to Claim 1, ~~wherein including at least two or more of the semiconductor laser devices are arranged in a single package, and each of~~ wherein the laser chip emits chips emit different oscillation ~~wavelength from each other~~ wavelengths, and each of multilayer dielectric film on the optical exit face of each laser chip is ~~formed of~~ the same material with the same thickness.

20. (Currently Amended) The semiconductor laser device according to Claim 2, ~~wherein including at least two or more of the semiconductor laser devices are arranged in a single package, and each of~~ wherein the laser chip emits chips emit different oscillation

• In re Appln. of MATSUOKA et al.
Application No. Unassigned

~~wavelength from each other~~ wavelengths, and each of multilayer dielectric film on the optical exit face of each laser chip is ~~formed of~~ the same material with the same thickness.